



STATE & PRIVATE FORESTRY FOREST HEALTH PROTECTION SOUTH SIERRA SHARED SERVICE AREA



Report SSSA 13-2

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To: Edward E. Armenta, Forest Supervisor, Inyo National Forest
Diana Pietrasanta, South Zone Deputy District Ranger, Inyo National Forest

Subject: Assessment of Fuel Reduction Treatments at Tom's Place & Aspen Spring, California

Summary: Heather Stone, BLM and Forest Service Interagency Monitoring Coordinator, requested the assistance of South Sierra Shared Service Area, Forest Health Protection to evaluate piñon mortality following with recent fuel reduction activities near small communities of Tom's Place and Aspen Spring, California. Treatments were conducted fall 2011, and fading trees were noted by late summer 2012. Trees were mass attacked by bark beetles which were concluded to have directly caused mortality; no pathogens were observed. Severe lack of winter precipitation in 2011-2012 most likely contributed to tree susceptibility. The unreliability for good rainfall in winter months unfortunately made for bad timing of treatments; trees were unable to recover in the new microclimate and thus at high risk for attack.

Introduction

Heather Stone, BLM and Forest Service Interagency Monitoring Coordinator, requested the assistance of South Sierra Shared Service Area, Forest Health Protection to evaluate piñon mortality associated with recent fuel reduction activities near small communities of Tom's Place and Aspen Spring, California. Additional acres of treatments were also completed in Whitney Portal, west of Lone Pine, CA with analogous mortality. This report discusses observations at Tom's Place and Aspen Springs (accompanied by Heather and Forest Silviculturist, Scott Kusumoto) and potential factors that resulted in bark beetle associated mortality focused on piñon pines. Alternatives can also be applied to Whitney Portal if mortality activity is similar.

The small housing communities of Tom's Place and Aspen Spring are located east end of the Rock Creek drainage, White Mountain Ranger District, Inyo National Forest (M261, Township 4 S, Range 30 E, Sections 32 & 33). Private properties are directly adjacent to National Forest lands. Fuel reduction treatments have been recently initiated in these areas to reduce potential for catastrophic wildfire, natural or human-caused. Treatments are focused along roadsides, behind property boundaries, or in areas where piñon is encroaching into formerly shrub/brush landscapes.

Proposed treatment areas are currently dominated by piñon pine and various sagebrush species, intermixed with mountain mahogany and occasional Jeffrey pines. Historical landscape photos as recent as 50 years ago, show the area was formerly mostly brush and shrub vegetation. Piñon pines are moving downslope and upslope, creating highly stocked stands that have minimal understory vegetation. Trees in these recent encroached stands are young, not considered mature established piñon forests. These conditions create

potential for high severity and intensity fire risk. Case in point, the Birch Fire in 2002 burned over 2549 acres directly south of Tom's Place, resulting in near complete piñon loss in fire-affected areas (Meyer and Safford 2012). All piñon pines in 97% of burn study plots burned at high severity – 100% tree mortality, where dense stands were 25 times more likely to burn (Figure 1, Meyer and Safford 2012).



Figure 1. Widespread singleleaf pinyon pine (*Pinus monophylla*) mortality and vegetation change nine years following the Birch Fire (2002). Photo courtesy of Meyer and Safford 2012.

Treatments

At Tom's Place, treatments have been focused around forested land surrounding the local powerstation, and adjacent major roads (Rock Creek Road (FS Road 12), Crowley Lake Drive, FS Rd 4S278, State Highway 395). Guidelines for thinning: 20 to 30 foot spacing between trees, removal of most regenerating piñon, and retention of biggest and vigorous trees; ten percent of the area was allowed for some tree clumping; and additional brush removal. Tree debris and slash was chipped then scattered, not to exceed more than 1 inch in depth. Thinning treatments were done by hand due to uneven surfaces and numerous rocks, whereas mechanical mowing was done in a few areas where ground was level and less dense with trees. Most treatments were started in the fall of 2011, to be completed by winter 2012.

Aspen Springs only required a few acres of treatments west of the community that borders National Forest lands. Only three property boundaries were adjacent to treatments across eight acres. Guidelines and treatments were consistent to Tom's Place but piles were not yet completely treated, and beetle mortality was concentrated in a small group of leave trees bordering untreated stands. Further treatment was suspended until FHP assessed the areas.

Pest Activity

Residual trees did not begin to start turning color until late in the summer at Tom's Place and Aspen Springs. Most attacks occurred in larger piñons > 15 inches at root collar. A few fading trees at Tom's Place were directly adjacent to the fence line; they appeared recently pruned (not by FS) and root base disturbed by asphalt layout (see Figure 2). Red turpentine beetles (*Dendroctonus valens*) were noted around the base of these trees, and extensively hit by piñon ips (*Ips confusus*). Other *Ips* caused mortality was scattered within treatment sites, most displayed symptoms of prior decline in comparison to neighboring healthy trees. No root disease or other pathogens were observed. Mortality did not appear aggravated by chips, chip piles, or slash piles.



Figure 2. Base of declining piñon surrounding powerstation at Tom's Place. Note pruning and heavy pitching from mechanical scarring at base.

At Aspen Springs, mortality was concentrated in a group of five mature trees, left in the treatment site after thinning (see Figure 3 and Figure 4). The site was thinned from 140-180 ft²/acre down to 60-80 ft²/acre last fall. Trees averaged >12 inches at root collar and successfully attacked by *Ips confusus* during the summer. Attacked trees were situated along a wet bottom site (suggested by ground vegetation) where snow collects from the upper gully of the hillside. No other trees in the surrounding treatments and untreated stands were attacked, nor were any slash piles. However, two other pockets of bark beetle mortality (each with three trees per group) estimated four and two years previous were observed in untreated stands nearby, indicating bark beetle activity in the area.



Figure 3. Bark beetle associated mortality within treatments at Aspen Springs. Note: Compare density of background stands to treatment openings.

Discussion

Mortality associated with the native Piñon beetle, *Ips confusus*, is not uncommon during periods of drought or low precipitation in the state. This beetle specifically attacks piñon pines, most often responsible for piñon mortality. As with other bark beetles, it favors trees that may be compromised by prior damage, injury, infection, or stress. Pockets of chronic mortality on the Inyo National Forest have been linked with evidence of Black Stain root disease (*Leptographium* spp.). Dwarf mistletoe, piñon sawfly, and red turpentine beetle also contribute to individual tree susceptibility to beetle attack. Stand conditions like high density and stocking affect tree development thereby are strongly correlated for *Ips* infestation potential (Negron and Wilson 2003, Santos and Whitham 2009). In California most bark beetle infestations are typically triggered by prolonged drought events or periods of low winter precipitation (Smith 2007). The widespread piñon mortality that occurred across three southwestern states was also strongly associated with several years of drought (Shaw et al. 2005, Clifford et al. 2008). For that reason drought in combination with other physiological stressors significantly increases trees' susceptibility to bark beetles. Annual California snow reports indicate that Mono County was 20% below average during 2011-2012. Previous to 2010-2011, the state was running on its third year of consecutive drought from 2007-2009. On average, recent precipitation has been low and winter months have been warmer than usual.

Silvicultural treatments that reduce stocking and stand density should be focused in high risk areas for *Ips* infestation (Negron and Wilson 2003, Skelley and Christopherson 2002). Treatments such as these implemented at Tom's Place and Aspen Springs were appropriate for reducing fuel loads and deterring bark beetle infestation. Treatments were also well timed after beetle annual flight (fall 2011) to reduce attractiveness of slash material while helping residual trees acclimate to new microclimates over the winter months. However, predictions for annual precipitation are never accurate; prevention treatments can only be implemented with optimism of good rainfall to help residual trees reinvigorate. One suggestion to monitor local populations of beetles would be to access Forest Health Monitoring Annual Mortality Detection Surveys¹. Overlay of surveys can show trends of local beetle activity in the vicinity, to help managers prioritize timing and treatment locations. In keeping with fuel reduction, removal of recent dead trees is strongly recommended as retained red needles increase torching danger. Continued prudence in reducing mechanical injury to residual trees will also help prevent introduction of pathogens or attraction of other pests.

¹ Region 5, Aerial Detection Monitoring program. http://www.fs.usda.gov/detail/r5/forest-grasslandhealth/?cid=fsbdev3_046696



Figure 4. Another view of treatments and bark beetle associated mortality at Aspen Springs. *Note older mortality in the far background due to bark beetles.*

We hope this information has been useful and insightful to management efforts. If there are any further questions or concerns regarding this report or future treatment plans, please do not hesitate to contact us.

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